Name:

at1119paper: Complete the Square, b = odd (v511)

Example

By completing the square, find both solutions to the given equation:

$$x^2 - 41x = -348$$

Add $\left(\frac{-41}{2}\right)^2$, which equals $\frac{1681}{4}$, to both sides of the equation.

$$x^2 - 41x + \frac{1681}{4} = \frac{289}{4}$$

Factor the left side.

$$\left(x + \frac{-41}{2}\right)^2 = \frac{289}{4}$$

Undo the squaring.

$$\begin{array}{rcl} x + \frac{-41}{2} = \frac{-17}{2} & \text{or} & x + \frac{-41}{2} = \frac{17}{2} \\ x = \frac{41 - 17}{2} & \text{or} & x = \frac{41 + 17}{2} \\ x = 12 & \text{or} & x = 29 \end{array}$$

Question 1

By completing the square, find both solutions to the given equation:

$$x^2 - 37x = 1820$$

$$x^2 - 37x + \frac{1369}{4} = \frac{8649}{4}$$

$$\left(x + \frac{-37}{2}\right)^2 = \frac{8649}{4}$$

$$\begin{array}{rcl} x + \frac{-37}{2} = \frac{-93}{2} & \text{or} & x + \frac{-37}{2} = \frac{93}{2} \\ x = \frac{37 - 93}{2} & \text{or} & x = \frac{37 + 93}{2} \\ x = -28 & \text{or} & x = 65 \end{array}$$

Question 2

By completing the square, find both solutions to the given equation:

$$x^2 + 23x = 288$$

$$x^2 + 23x + \frac{529}{4} = \frac{1681}{4}$$

$$\left(x + \frac{23}{2}\right)^2 = \frac{1681}{4}$$

$$x + \frac{23}{2} = \frac{-41}{2} \quad \text{or} \quad x + \frac{23}{2} = \frac{41}{2}$$

$$x = \frac{-23 - 41}{2} \quad \text{or} \quad x = \frac{-23 + 41}{2}$$

$$x = -32 \quad \text{or} \quad x = 9$$

Question 3

By completing the square, find both solutions to the given equation:

$$x^2 + 57x = -392$$

$$x^2 + 57x + \frac{3249}{4} = \frac{1681}{4}$$

$$\left(x + \frac{57}{2}\right)^2 = \frac{1681}{4}$$

$$x + \frac{57}{2} = \frac{-41}{2} \quad \text{or} \quad x + \frac{57}{2} = \frac{41}{2}$$

$$x = \frac{-57 - 41}{2} \quad \text{or} \quad x = \frac{-57 + 41}{2}$$

$$x = -49 \quad \text{or} \quad x = -8$$